

Progressive Cavity Pump

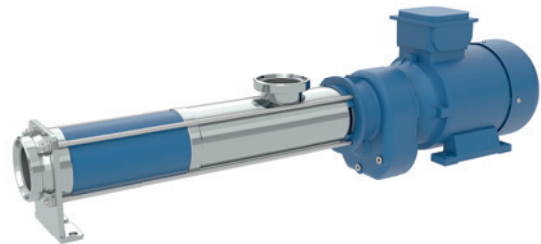
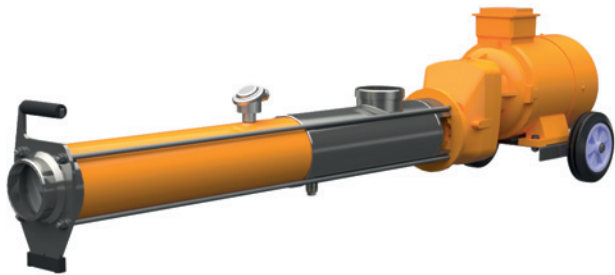
Operating instructions

Series:

**AEB1F, AEB1E, AEB2E,
AEB2N**

Designs:

ME, SE, VE



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Read carefully before use.
Retain for future use.

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1 About this document

This manual

- Is part of the pump
- Applies to the afore-mentioned pump series
- Describes safe and appropriate operation during all operating phases

1.1 Target groups

Target group	Duty
Operating company	<ul style="list-style-type: none"> ▶ Keep this manual available at the site of operation of the system, including for later use. ▶ Ensure that personnel read and follow the instructions in this manual and the other applicable documents, especially all safety instructions and warnings. ▶ Observe any additional rules and regulations referring to the system.
Qualified personnel, fitter	<ul style="list-style-type: none"> ▶ Read, observe and follow this manual and the other applicable documents, especially all safety instructions and warnings.





Tab. 1 Target groups and their duties

1.2 Other applicable documents



Document	Purpose
Acceptance test report	Tested performance data of the pump
ATEX additional instructions	Operation in explosion hazard areas
Order data sheet	Technical specifications, conditions of operation
Setup drawing	Setup dimensions, connection dimensions etc.
Declaration of conformity	Conformity with standards, contents of the declaration of conformity (→ 9.4 Declaration of conformity according to EC Machine Directive, Page 35).
Sectional drawing	Sectional drawing, part numbers, component designations
Technical description	Technical specifications, operating limits
Supplier documentation	Technical documentation for parts supplied by subcontractors

Tab. 2 Other applicable documents and their purpose

1.3 Warnings and symbols


Warning	Risk level	Consequences of disregard
	Immediate acute risk	Death, serious bodily harm
	Potentially acute risk	Death, serious bodily harm
	Potentially hazardous situation	Minor bodily harm
	Potentially hazardous situation	Material damage

Tab. 3 Warnings and consequences of disregarding them

Symbol	Meaning
	Safety warning sign ▶ Take note of all information highlighted by the safety warning sign and follow the instructions to avoid injury or death.
▶	Instruction
1. , 2. , etc.	Multiple-step instructions
✓	Precondition
→	Cross reference
	Information, advice

Tab. 4 Symbols and their meaning

2 Safety

 The manufacturer does not accept any liability for damage resulting from disregard of the entire documentation.


2.1 Intended use

- Only use the pump for pumping the agreed pumped media (→ order data sheet).
- Adhere to the operating limits.
- Avoid dry running:
 - Make sure the pump is only operated with, and never without, a pumped medium.
- Avoid cavitation:
 - Fully open the suction-side armature and do not use it to adjust the flow rate.
 - Open the pressure-side fitting completely.
- Avoid damage to the motor:
 - Note the maximum permissible number of times the motor can be switched on per hour (→ manufacturer's specifications).
- Consult the manufacturer about any other use.
- Pumps delivered without a motor must be assembled into a pump unit according to the provisions of EC Machine Directive 2006/42/EC.

Prevention of likely misuse (examples)

- Note the operating limits of the pump with regard to temperature, pressure, viscosity, flow rate and motor speed (→ order data sheet).
The pressures given in the order data sheet only apply for approximate static pressure. Consult the manufacturer on dynamically changing pressure.
- When media containing solids, ensure the limits for the proportion of solids and the grain size are maintained (→ order data sheet, technical description).
- When using auxiliary systems, ensure there is a continuous supply of the appropriate operating medium.
- Do not operate the pump while the pressure-side fitting is closed.
- Only select the setup type according to these operating instructions. For example, the following are not allowed:
 - Hanging base plate pumps in the pipe
 - Overhead installation
 - Installation in the immediate vicinity of extreme heat or cold sources
 - Installation too close to the wall

2.2 General safety instructions

 Observe the following regulations before carrying out any work.

2.2.1 Product safety

The pump has been constructed according to the latest technology and recognized technical safety rules. Nevertheless, operation of the pump can still put the life and health of the user or third parties at risk or damage the pump or other property.

- Only operate the pump if it is in perfect technical condition and only use it as intended, staying aware of safety and risks, and in adherence to the instructions in this manual.
- Keep this manual and all other applicable documents complete, legible and accessible to personnel at all times.
- Refrain from any procedures and actions that would pose a risk to personnel or third parties.
- In the event of any safety-relevant malfunctions, shut down the pump immediately and have the malfunction corrected by appropriate personnel.
- In addition to the entire documentation for the product, comply with statutory or other safety and accident-prevention regulations and the applicable standards and guidelines in the country where the pump is operated.

2.2.2 Operator's obligations

Safety-conscious operation

- Only operate the pump if it is in perfect technical condition and only use it as intended, staying aware of safety and risks, and in adherence to the instructions in this manual.
- Ensure that the following safety aspects are observed and monitored:
 - Intended use
 - Statutory or other safety and accident-prevention regulations
 - Safety regulations governing the handling of hazardous substances
 - Applicable standards and guidelines in the country where the pump is operated
- Make personal protective equipment available.

Qualified personnel

- Make sure all personnel tasked with work on the pump have read and understood this manual and all other applicable documents, especially the safety, maintenance and repair information, before they start any work.
- Organize responsibilities, areas of competence and the supervision of personnel.

- Ensure that all work is carried out by specialist technicians only:
 - Fitting, repair and maintenance work
 - Work on the electrical system
- Make sure that trainee personnel only work on the pump under supervision of specialist technicians.

Safety equipment

- Provide the following safety equipment and verify its functionality:
 - For hot, cold and moving parts: on-site safety guards for the pump
 - For possible electrostatic charges: provide the necessary grounding

Warranty

- Obtain the manufacturer's approval prior to carrying out any modifications, repairs or alterations during the warranty period.
- Only use genuine parts or parts that have been approved by the manufacturer.

Drive system

For pumps delivered without a drive system, comply with the following requirements for the drive system:

- When using three-phase asynchronous motors, observe IEC 60034-30-1.
- Power of the drive according to EN ISO 5199 is recommended (EN ISO 5199 also applicable for drives of progressive cavity pumps).
- For pumps with stub shaft, connect drive system and pump directly with stub shaft (special drives required)

2.2.3 Obligations of personnel

- All directions given on the pump must be followed (and kept legible), e.g. the arrow indicating the sense of rotation and the markings for fluid connections.
- Pump, safety guarding and components:
 - Do not step on them or use as a climbing aid
 - Do not use them to support boards, ramps or beams
 - Do not use them as a fixing point for winches or supports
 - Do not use them for storing paper or similar materials
 - Do not use hot pump or motor components as a heating point
 - Do not de-ice using gas burners or similar tools
- Do not remove the safety guarding for hot, cold or moving parts during operation.
- Use personal protective equipment whenever necessary.
- Only carry out work on the pump while it is not running.
- Isolate the motor from its supply voltage and secure it against being switched back on again when carrying out any installation or maintenance work.
- Reinstall the safety equipment on the pump as required by regulations after any work on the pump.

2.3 Specific hazards

2.3.1 Potentially explosive area

- (→ ATEX additional instructions).

2.3.2 Hazardous pumped liquids

- Follow the safety regulations for handling hazardous substances when handling hazardous (e.g. hot, flammable, poisonous or potentially harmful) pumped liquids.
- Use protective equipment when carrying out any work on the pump.

3 Layout and function

3.1 Labels

3.1.1 Nameplate


 If the pump is not approved for the explosion-hazard area, the field 2 remains empty.



Fig. 1 Nameplate (example with explosion protection mark)

- 1 QR code
- 2 Explosion protection mark
- 3 Pump equipment number
- 4 Pump type
- 5 Direction of rotation or flow
- 6 Direction of rotation or flow
- 7 Year of manufacture

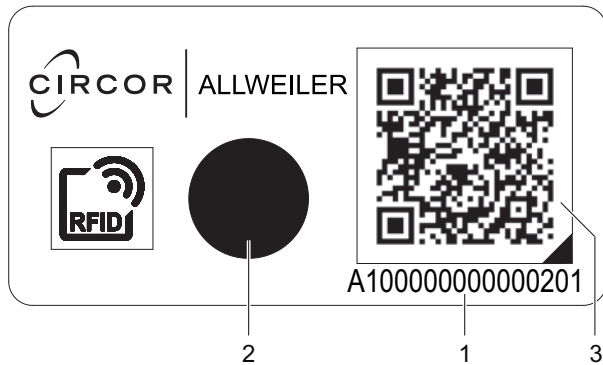


Fig. 2 Digital nameplate, variant with optional RFID transmitter (example)

- 1 Identification number
- 2 RFID transponder (HF)
- 3 QR code

3.1.2 Pump type code

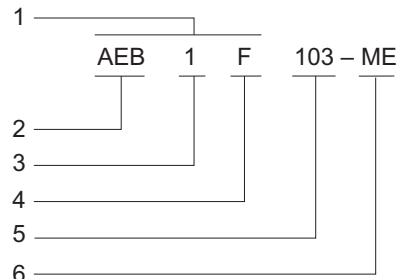



Fig. 3 Pump type code (example)

Position	Meaning
1	Series
2	Product
	AEB Allweiler progressive cavity pump, close-coupled
3	Number of stages
4	Mechanical system (F, E, N)
5	Size
6	Design
	Q Mash version with external bearing
	SE Drink version with external bearing
	VE Vertical installation with external bearing

Tab. 5 Pump type code

3.2 Layout

 Example representation of 3 variants. Further variants are described in the appendix (→ 9.1.2 Sectional drawings, Page 29).

3.2.1 ME Design

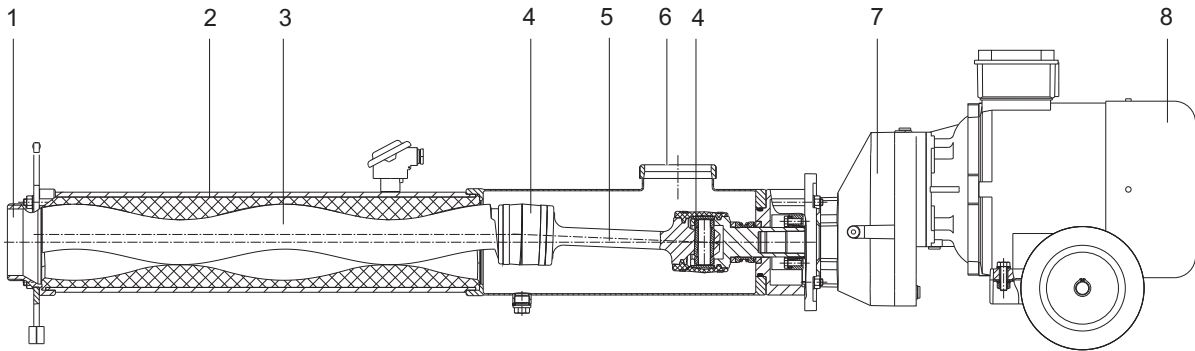


Fig. 4 Layout – AEB, ME design

- | | | |
|-----------------|-------------------------------|---------|
| 1 Pressure side | 4 Joint | 7 Gears |
| 2 Stator | 5 Universal joint shaft | 8 Motor |
| 3 Rotor | 6 Suction side/suction casing | |

3.2.2 SE Design

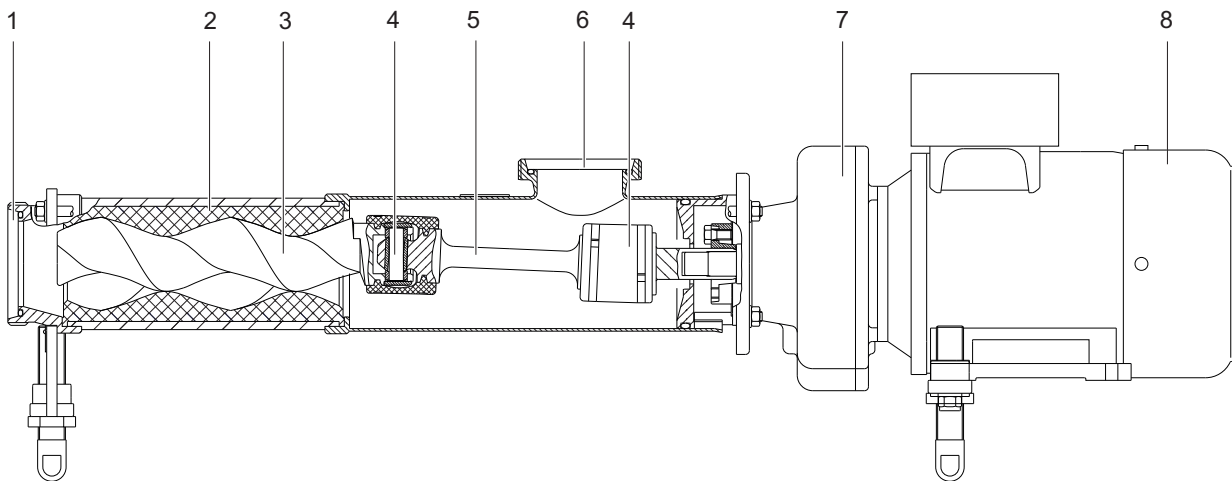


Fig. 5 Layout – AEB, SE design

- | | | |
|-----------------|-------------------------------|---------|
| 1 Pressure side | 4 Joint | 7 Gears |
| 2 Stator | 5 Universal joint shaft | 8 Motor |
| 3 Rotor | 6 Suction side/suction casing | |

3.2.3 VE Design

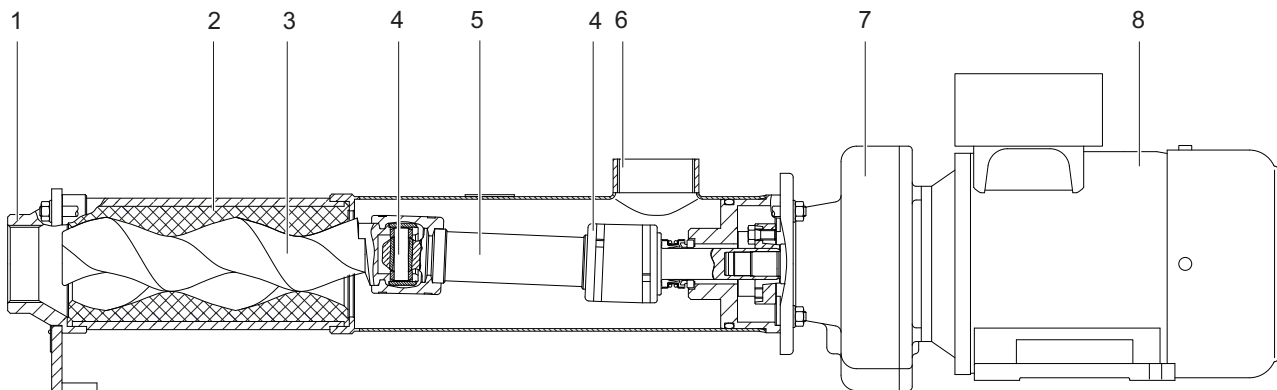



Fig. 6 Layout – AEB, VE design

1	Pressure side	4	Joint	7	Gears
2	Stator	5	Universal joint shaft	8	Motor
3	Rotor	6	Suction side/suction casing		

3.3 Function

- Self-priming, rotating positive displacement pump
- One or two stage
- The rotor rotates in a stationary stator and displaces the liquid in the direction of the pump outlet
- For conveying and metering sensitive media, including those containing fibers or solids

3.4 Shaft seals

 Mechanical seals have functional leaks.

- Single-action, non-balanced mechanical seal

3.5 Bearings and lubrication

Close-coupled pump, ME, SE, VE design:

- Bearing of the stub shaft in the reinforced bearings of the drive motor

Universal joint shaft:

- Oil-lubricated and liquid-encapsulated pin joints

3.6 Types of setup

- The following types of setup are possible:
- Horizontal, dry
 - Vertical dry, wall installation (only permissible if drive and bearing at top)

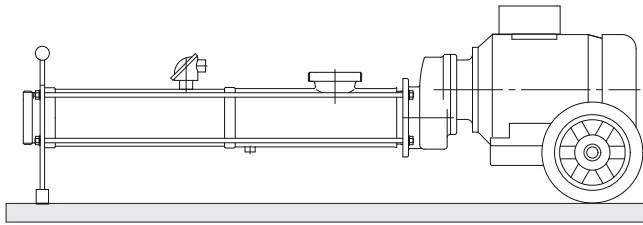


Fig. 7 Horizontal dry pump unit setup on chassis, ME design

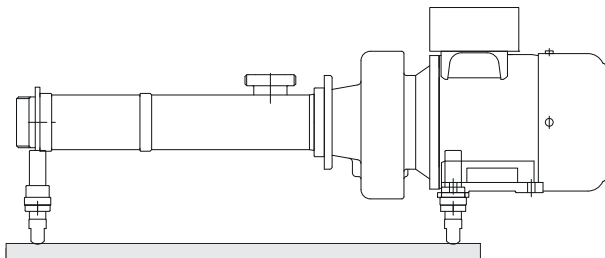


Fig. 8 Horizontal dry pump unit setup on tilting base, SE design

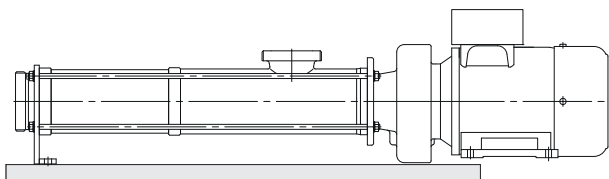


Fig. 9 Horizontal dry pump unit setup, SE design

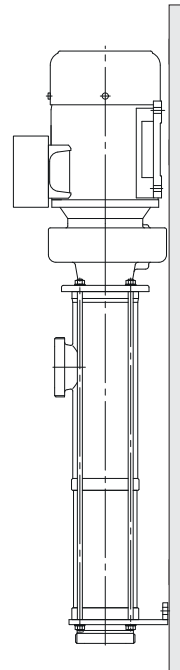



Fig. 10 Horizontal dry pump unit setup, wall installation, VE design

4 Transport, storage and disposal

4.1 Transport

 Weight specifications (→ order data sheet).

4.1.1 Unpacking and inspection on delivery

1. Unpack the pump/aggregate on delivery and inspect it for transport damage.
2. Report any transport damage to the manufacturer immediately.
3. Dispose of packaging material according to local regulations.

4.1.2 Lifting

⚠ DANGER

Death or crushing of limbs caused by falling or overturning loads!

- ▶ Use lifting gear appropriate for the total weight to be transported.
- ▶ Select the attachment points according to their center of gravity and weight distribution.
- ▶ Use at least two hoisting cables.
- ▶ For vertical transport: Provide a securing rope between the hook and load eyebolt of the motor.
- ▶ Never fasten the lifting gear onto the motor eyebolt (unless used as a safety device against tipping over for units with a high center of gravity).
- ▶ Do not stand under suspended loads.

1. Make sure that all connections are sealed with plugs.
2. Fasten lifting gear according to the following illustrations:
 - Place lifting straps around the suction casing of the pump.
 - Place lifting straps around the suction casing and around the motor of the pump unit.

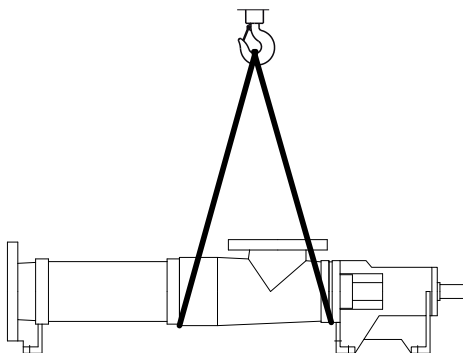


Fig. 11 Fastening the lifting gear to the pump (as illustrated)

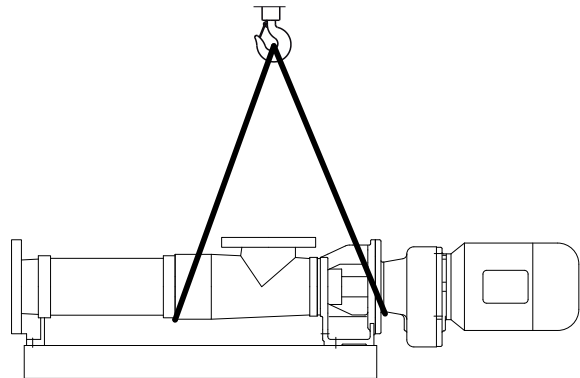



Fig. 12 Fastening the lifting gear to the pump unit, close-coupled pump (as illustrated)

4.2 Treatment for storage

 The pump is not treated for storage at the factory in the standard version.

Treatment is not necessary for non-rusting materials. Contact the manufacturer for recommendations regarding preservatives.

NOTE

Material damage due to missing or inappropriate treatment for storage!

- ▶ Treat the pump properly, inside and outside, for storage.
- ▶ Treat seals, stator elastomer, joint sleeves and rotor worm exclusively with silicone oil.

1. Preservative appropriate for the type and duration of storage (→ 9.2.2 Preservatives, Page 31).
2. Use the preservative specified by the manufacturer.
3. All bare metal parts should be treated, inside and outside.

4.3 Storage


NOTE

Material damage due to inappropriate storage!

- ▶ Treat and store the pump properly.
- ▶ For a longer storage time, dismantle the elastomer stator and store it in dark film at -10 to 25 °C.

1. Seal all openings with blind flanges, blind plugs or plastic covers.
2. Make sure the storage room meets the following conditions:
 - Dry
 - Frost-free
 - Vibration-free
 - Dust-free
3. Turn the shaft once a month.
4. Make sure the shaft and bearing change their rotational position in the process.

4.4 Removing preservative

-  Only necessary for pumps treated for storage.

NOTE

High water pressure or spray water can damage bearings!

- ▶ Do not clean bearing areas with a water or steam jet.


NOTE

Damage from using the wrong cleaning agents!

- ▶ Ensure the cleaning agent does not corrode the joint sleeves, stator and seals.

1. Flush the pump with the liquid to remove the preservative.
2. If the liquid must not be contaminated, proceed as follows:
 - Disassemble the pump.
 - Clean all metal parts with approved cleaning agents.
3. Dispose of preservatives cleaning agents in accordance with local regulations.
4. For storage times in excess of 12 months:
 - Replace the elastomer parts made of EP rubber (EPDM).
 - Check all elastomer parts (stator, O-rings, shaft seals) for proper elasticity and replace them if necessary.
5. If present, check that all pressure relief valves and check valves can move freely.

4.5 Disposal


-  Plastic parts can be contaminated by poisonous or radioactive pumped liquids to such an extent that cleaning will be insufficient.

WARNING

Risk of poisoning and environmental damage by the pumped liquid or oil!

- ▶ Use protective equipment when carrying out any work on the pump.
 - ▶ Prior to the disposal of the pump:
 - Collect and dispose of any leaking pumped fluid or oil in accordance with local regulations.
 - Neutralize residues of pumped liquid in the pump.
 - Removing preservative (→ 4.4 Removing preservative, Page 13).
 - ▶ Remove the plastic parts and elastomers and dispose of them in accordance with local regulations.
-
- ▶ Dispose of the pump in accordance with local regulations.

5 Setup and connection

 For pumps in explosion-hazard areas (→ ATEX additional instructions).

NOTE

Material damage due to distortion or passage of electrical current in the bearing!

- ▶ Do not make any structural modifications to the pump unit or pump casing.
 - ▶ Do not carry out any welding work on the pump unit or pump casing.
-

NOTE

Material damage caused by dirt!

- ▶ Do not remove the transportation locks until immediately before installing the pump.
 - ▶ Do not remove any covers or transport and sealing covers until immediately before connecting the pipes to the pump.
-

5.1 Preparing the setup

5.1.1 Determining the setup type

NOTE

Damage to the bearings and shaft seal due to incorrect setup type!

- ▶ Set up the pump according to the order-based setup type.
- ▶ Determine correct setup type (→ order data sheet).
 - The ME and SE designs must be installed horizontally
 - The VE design can be installed horizontally or vertically with the drive on top


5.1.2 Checking the ambient conditions

- ▶ Make sure the required ambient conditions are fulfilled (→ 9.2.1 Ambient conditions, Page 31).

5.1.3 Preparing the installation site

- ▶ Ensure the installation site meets the following conditions:
 - Pump is freely accessible from all sides
 - Sufficient space for the installation/removal of the pipes and for maintenance and repair work, especially for the removal and installation of the pump and the motor
 - Pump not exposed to external vibrations (damage to bearings)
 - Frost protection

5.1.4 Preparing the foundation and surface


-  Setup options:
- With concrete foundation
 - With steel foundation frame
 - As a mobile unit

- ▶ Make sure the foundation and surface meet the following conditions:
 - Level
 - Clean (no oil, dust or other impurities)
 - Capable of bearing the weight of the pump unit and all operating forces
 - Ensure the pump is stable and cannot tip over
 - Ensure base plate makes contact over entire surface
 - With concrete foundation: standard concrete of strength class B 25

5.1.5 Removing preservative

- ▶ If the pump is to be put into operation immediately after setup and connection: Remove the preservative prior to installation (→ 4.4 Removing preservative, Page 13).

5.2 Installation on a foundation

 Only with base plate version

NOTE


Material damage due to distortion of the base plate!

► Place the base plate on the foundation and secure it as described in the following.

5.2.1 Placing the pump unit on the foundation

- ✓ Implements, tools and materials:
 - Foundation bolts (→ setup drawing)
 - Steel washers
 - Non-shrinking mortar grout
 - Spirit level

1. Lifting the pump unit (→ 4.1 Transport, Page 12).
2. Attach the foundation bolts from below into the base plate fixing holes.

 Observe the manufacturer's instructions when using adhesive anchors.

3. Set the pump unit down on the foundation. When doing so, sink the foundation bolts into the prepared anchoring holes.

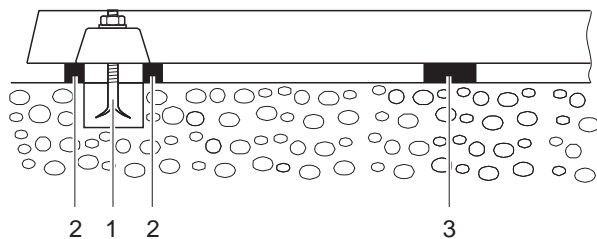



Fig. 13 Installation with foundation


4. Use steel washers to align the pump unit to the height and system dimensions as described in the following:
 - Place a steel washer (2) to the left and right-hand side of each foundation bolt (1).
 - If the distance between the anchoring holes is greater than 750 mm, place additional steel washers (3) in the middle, on each side of the base plate.
5. Make sure the steel washers lie flat against the base plate, in full contact.
6. Use the integrated spirit level to check whether the pump is level end to end and side to side with a maximum allowable tilt of 1 mm/m.
7. Repeat the procedure until the base plate is correctly aligned.

5.2.2 Attaching the pump unit

 The damping behavior is improved by filling the base plate with mortar grout. When filling, isolate any present adjusting screw for the engine height adjustment.

1. Fill the anchoring holes with mortar grout.
2. When the mortar grout has set, screw down the base plate at three points with the specified torque.
3. Before tightening the remaining bolts, compensate for any unevenness in the surface using metal spacing shims next to each bolt.
4. Fill the inside of the base plate with concrete, if intended. Knock on the base plate to ensure that no cavities are created in the process.

5.3 Installing the motor

 Only necessary if the pump unit is assembled on site.

NOTE

Material damage caused by knocks and bumps!

- ▶ Do not knock or hit any components of the pump.
1. Remove the transport seal for pumps with a mechanical seal.
 2. Clean stub shaft and motor shaft.
 3. Push the clamping set onto the stub shaft.
 4. Insert the motor shaft into the stub shaft and align both shaft ends so that they are flush with one another.
 5. Align the clamping set correctly.
 6. Tighten screws crosswise. Observe the indicated torque information on the clamping set.

5.4 Planning the pipes


5.4.1 Specifying supports and flange connections

NOTE

Material damage due to excessive forces and torques exerted by the piping on the pump!

- ▶ Do not exceed the permissible limits
1. Calculate the pipe forces, taking every possible operating condition into account:
 - Cold/warm
 - Empty/full
 - Depressurized/pressurized
 - Positional changes of the flanges
 2. Ensure the pipe supports have permanent low-friction properties and do not seize up due to corrosion.

5.4.2 Specifying nominal diameters

 Keep the flow resistance in the pipes as low as possible.


- ▶ Define nominal pipe widths in accordance with spool piece nominal widths as far as possible.

5.4.3 Providing safety and control devices (recommended)

Avoiding reverse running

- ▶ Install a non-return valve between the outlet flange and the stop valve to ensure the medium does not flow back when the pump is switched off.

Making provisions for isolating and shutting off pipes

 For maintenance and repair work.

- ▶ Provide shut-off devices in the suction and pressure lines.

Allowing measurement of the operating conditions

1. Provide pressure gauges for pressure measurements in the suction and pressure lines.
2. Provide for pump-side temperature measurements.

Providing dry-running protection

- ▶ Provide suitable dry protection to protect the pump against dry running and resulting damage:
 - Select dry protection according to the specific application.
 - Select dry protection in consultation with the manufacturer.

Avoiding high pressures

- ▶ To switch off the pump at high pressures, provide suitable shutdown devices, for example, a pressure switch.

5.5 Connecting the pipes

5.5.1 Keeping the piping clean

NOTE

Material damage due to impurities in the pump!

- ▶ Make sure no impurities or foreign particles enter the pump.

1. Clean all piping parts and fittings prior to assembly.
2. Ensure no flange seals protrude inwards.
3. Remove any blank flanges, plugs, protective foils and/or protective paint from the flanges.

5.5.2 Installing the suction pipe

1. Remove the transport and sealing covers from the pump.
2. To avoid air pockets: run the pipes with a continuous slope up to the pump.
3. Ensure no seals protrude inwards.
4. For suction operation: install a foot valve in the suction pipe to prevent the pump and suction pipe from running empty during downtimes.

5.5.3 Installing the pressure line

1. Remove the transport and sealing covers from the pump.
2. Install the pressure line.
3. Ensure no seals protrude inwards.

5.5.4 Inspection for stress-free pipe connections

- ✓ Piping installed and cooled down


NOTE

Material damage due to distorted pump casing

- ▶ Ensure that all pipes are stress relieved when connected to the pump.


1. Disconnect the pipe connecting flanges from the pump.
2. Check whether the pipes can be moved freely in all directions within the expected range of expansion:
 - Nominal diameter < 150 mm : by hand
 - Nominal diameter > 150 mm : with a small lever
3. Make sure the flange surfaces are parallel.
4. Reconnect the pipe connecting flanges to the pump.

5.5.5 Inspecting the support foot on the discharge casing (504) for distortion

-  If support foot present.

1. Loosen the screwed connection of the support foot on the discharge casing to the base plate.
2. If the support foot moves or is under pressure, compensate for distortion by inserting more shims under the base plate.
3. Screw support foot back onto base plate.

5.6 Electrical connection

-  Follow the instructions of the motor manufacturer.

DANGER

Risk of death due to electric shock!

- ▶ Have all electrical work carried out by qualified electricians only.


DANGER

Risk of death due to rotating parts!

- ▶ Isolate the motor from its supply voltage and keep it locked when carrying out any fitting or maintenance work.


1. Connect the motor according to the connection diagram.
2. Make sure no danger arises due to electric power.
3. Install an EMERGENCY STOP switch.

6 Operation

 For pumps in explosion-hazard areas (→ ATEX additional instructions).


6.1 Preparing initial start-up

6.1.1 Identifying the pump type

 The pump versions are the design, bearing lubrication and the type of shaft seal, for example.


- ▶ Identify the pump type (→ order data sheet).

6.1.2 Removing preservative

 Only necessary for pumps treated for storage.

- ▶ Removing preservative (→ 4.4 Removing preservative, Page 13).

6.1.3 Filling pump

 Venting is not necessary.


DANGER

Danger to life due to hazardous media!

- ▶ Use protective equipment when carrying out any work on the pump.
- ▶ Safely collect escaping transport, sealing and heating media and dispose of them in an environmentally friendly manner.

1. Fill the pump and the suction pipe with pumped liquid.
2. Open the suction-side fitting.
3. Open the pressure-side fitting.
4. Verify that no pipe connections are leaking.

6.1.4 Turning the pump

 Only turn the pump when restarting and after longer down-times.

- ✓ Pump is filled

DANGER

Risk of death due to rotating parts!

- ▶ Use personal protective equipment when carrying out any work on the pump.
- ▶ Keep an adequate distance to rotating parts.


NOTE

The pump can break loose due to adhesions between the stator and rotor!

- ▶ Turn the pump briefly.
 - ▶ Do not strike the shaft.
1. Switch on the motor briefly and check that the rotor rotates properly and smoothly in the stator.
 2. If the rotor does not rotate, switch off the motor and secure it against being switched on again.
 3. Turn the shaft in the area behind the GLRD with a suitable tool.

6.1.5 Checking the sense of rotation

If the correct sense of rotation has already been determined when the pump is spinning, it is no longer necessary to check the sense of rotation.

 In the standard configuration, the pump is rotates counter-clockwise, viewed from the drive side onto the shaft. The pump rotates clockwise in special operating conditions, for example, when extracting from a vacuum or conveying media that do not tolerate gas inclusions.

 DANGER

Risk of death due to rotating parts!

- ▶ Use personal protective equipment when carrying out any work on the pump.
- ▶ Keep an adequate distance to rotating parts.

NOTE

Material damage caused by dry running!

- ▶ Make sure the pump is filled properly.
1. Identify the sense of rotation on the nameplate.
 2. Switch the motor on and immediately off again.
 3. Check whether the motor's sense of rotation is the same as that on the nameplate.
 4. If the sense of rotation is different: swap two phases.

6.2 Start-up

6.2.1 Switching on

- ✓ Pump unit set up and connected properly
- ✓ All connections stress-free and sealed
- ✓ All safety equipment installed and tested for functionality
- ✓ Pump correctly prepared and filled

 DANGER

Risk of injury due to running pump or hot pump parts!

- ▶ Do not touch the pump during operation.
- ▶ Do not carry out any work on the pump during operation.
- ▶ Allow the pump to cool down completely before starting any work.

 DANGER

Risk of injury and poisoning due to pumped liquid spraying out!

- ▶ Use protective equipment when carrying out any work on the pump.

NOTE

Risk of cavitation when throttling down the suction flow rate!

- ▶ Fully open the suction-side armature and do not use it to adjust the flow rate.
- ▶ Do not open the pressure-side fitting beyond the operating point.

NOTE

Material damage due to excessive pressure!

- ▶ Do not operate the pump while the pressure-side fitting is closed.

NOTE

Material damage caused by dry running!

- ▶ Make sure the pump is filled properly.
1. Open the pressure-side fitting.
 2. Open the suction-side fitting.
 3. Switch on the motor and make sure it is running smoothly.
 4. As soon as the motor has reached operating speed, determine the following parameters on the display fixtures and compare them with the order data sheet or acceptance test report:
 - Inlet pressure and pump end pressure
 - Temperature and viscosity of the medium
 5. After the first load under pressure and at operating temperature, check that the pump is not leaking.

6.2.2 Switching off

⚠ WARNING

Risk of injury due to hot pump parts!

► Use protective equipment when carrying out any work on the pump.

1. Switch off the motor.
2. After initial start-up: Check all tie bolts and retighten them if necessary.

6.3 Shutting down the pump

⚠ WARNING

Risk of injury and poisoning due to hazardous pumped liquids!

► Safely collect any leaking (pumped) liquid and dispose of it in accordance with the environmental rules and requirements.

► Take the following measures whenever the pump is shut down:

Pump is	Measure
...shut down for a prolonged period	► Perform measures according to the pumped liquid (→ Tab. 7 Measures depending on the behavior of the pumped liquid, Page 20).
...emptied	► Close the suction-side and pressure-side fittings.
...dismounted	► Isolate the motor from its power supply and secure it against unauthorized switch-on.
...put into storage	► Observe the storage instructions (→ 4.3 Storage, Page 13).

Tab. 6 Measures to be taken if the pump is shut down

Behavior of the pumped liquid	Duration of shutdown (depending on process)	
	Short	Long
Solids sedimenting	► Flush the pump.	► Flush the pump.
Solidifying/freezing, non-corrosive	► Heat up or empty the pump and containers ¹⁾ .	► Empty the pump and containers ¹⁾ .
Solidifying/freezing, corrosive	► Heat up or empty the pump and containers ¹⁾ .	► Empty the pump and containers ¹⁾ . ► Treat the pump and containers with preservative.
Remains liquid, non-corrosive	–	–
Remains liquid, corrosive	–	► Empty the pump and containers ¹⁾ . ► Treat the pump and containers with preservative.

Tab. 7 Measures depending on the behavior of the pumped liquid

1) See 6.3.2. Draining the pump

6.3.2 Draining the pump

► If present, remove the screw plug (502) from the suction casing (505).


6.4 Start-up following a shutdown period


1. If the pump is shut down for more than 2 years, take the following measures before restoring it to service:
 - Replace elastomers (stator, round sealing rings, shaft sealing rings).
 - Replace the oil in the spur gear.
 - If necessary: Replace the motor bearing (→ operating instructions of the motor manufacturer).
2. Carry out the same steps as for the initial start-up (→ 6.1 Preparing initial start-up, Page 18).

6.5 Operating the stand-by pump


- ✓ Stand-by pump filled and bled
- Operate the stand-by pump at least once a week.

7 Maintenance

 For pumps in explosion-hazard areas (→ ATEX additional instructions).

 Trained service technicians are available for fitting and repair work. Present a pumped medium certificate (DIN safety data sheet or safety certificate) when requesting service.

7.1 Inspections

 The inspection intervals depend on the operational strain on the pump.

DANGER

Risk of injury due to running pump!

- ▶ Do not touch the pump during operation.
- ▶ Do not carry out any work on the pump during operation.


WARNING

Risk of injury and poisoning due to hazardous pumped liquids!

- ▶ Use protective equipment when carrying out any work on the pump.

1. Check at appropriate intervals:
 - Adherence to the minimum flow rate
 - Normal operating conditions unchanged
2. For trouble-free operation, always ensure the following:
 - No dry running
 - No leaks in the pump, suction and pressure line
 - No cavitation
 - Suction-side gate valves open
 - Sufficient pump inlet pressure
 - No unusual temperature values
 - No unusual running noises or vibrations
 - No overloading of the system
 - No excessive leakage at the shaft seal

7.2 Maintenance

 Mechanical seals are subject to natural wear, which strongly depends on the respective operating conditions. Therefore, general statements regarding their service life cannot be made.

DANGER

Risk of injury due to running pump!

- ▶ Do not touch the pump during operation.
- ▶ Do not carry out any work on the pump during operation.
- ▶ Isolate the motor from its supply voltage and keep it locked when carrying out any fitting or maintenance work.

DANGER

Risk of death due to electric shock!



- ▶ Have all electrical work carried out by qualified electricians only.

WARNING

Risk of injury and poisoning due to hazardous or hot pumped liquids!


- ▶ Use protective equipment when carrying out any work on the pump.
- ▶ Allow the pump to cool down completely before commencing any work.
- ▶ Make sure the pump is depressurized.
- ▶ Empty the pump, safely collect the pumped liquid and dispose of it in accordance with environmental regulations.

7.2.1 Joints with oil lubrication

 Specified lubricants (→ 9.2.4 Lubricants, Page 31).
 Consult the manufacturer when using other joint oils. Joints are lubricated for life, oil changes recommended.

1. Change the joint oil after 8000 operating hours (→ Lubricant quantities, Page 33).
2. Check the joint sleeve for leaks when changing the oil.

7.2.2 Mechanical seals

 Mechanical seals have functional leaks (→ manufacturer's specifications).
 Mechanical seals are maintenance-free.

- ▶ In the event of major leaks due to wear: Replace mechanical seal.

7.2.3 Motor

- ▶ Service motor according to manufacturer's specifications (→ manufacturer's specifications).

7.2.4 Cleaning the pump

NOTE

Motor damage caused by high water pressure or water spray!

- ▶ Do not clean the motor with a water jet or steam jet.
- ▶ Clean large-scale grime from the pump.

7.3 Dismounting

DANGER

Risk of injury due to running pump!

- ▶ Do not touch the pump during operation.
- ▶ Do not carry out any work on the pump during operation.
- ▶ Isolate the motor from its supply voltage and keep it locked when carrying out any fitting or maintenance work.

DANGER

Risk of death due to electric shock!

- ▶ Have all electrical work carried out by qualified electricians only.

WARNING

Risk of injury and poisoning due to hazardous or hot pumped liquids!

- ▶ Use protective equipment when carrying out any work on the pump.
- ▶ Allow the pump to cool down completely before commencing any work.
- ▶ Make sure the pump is depressurized.
- ▶ Empty the pump, safely collect the pumped liquid and dispose of it in accordance with environmental regulations.

WARNING

Risk of injury due to heavy components!

- ▶ Pay attention to the component weight. Lift and transport heavy components using suitable lifting gear.
- ▶ Set down components safely and secure them against overturning or rolling away.

WARNING

Risk of injury during disassembly!

- ▶ Secure pressure-side fittings against unintentional opening.
- ▶ Depressurize the blocking pressure system, if available.
- ▶ Wear protective gloves as components can become very sharp through wear or damage.
- ▶ Remove spring-loaded components carefully (e.g. mechanical seal, tensioned bearing, valves etc.), as components can be ejected by the spring tension.
- ▶ Observe the manufacturer's specifications (for the motor, the gear box etc., for example).

7.3.1 Returning the pump to the manufacturer


- ✓ Pump depressurized
- ✓ Pump completely empty
- ✓ Electrical connections disconnected and motor secured against being switched on again
- ✓ Pump cooled down
- ✓ Pressure gage lines, pressure gage and holdings dismounted
- ▶ Enclose a truthful, and fully completed, safety certificate when returning pumps or components to the manufacturer. (→ 9.3 Declaration of harmlessness, Page 34).

Repairs	Measure for return
...at the customer's premises	▶ Return the defective component to the manufacturer.
...at the manufacturer's premises	<ul style="list-style-type: none"> ▶ Flush the pump and decontaminate it if it was used for hazardous pumped liquids. ▶ Return the complete pump (not disassembled) to the manufacturer.
...at the manufacturer's premises for warranty repairs	<ul style="list-style-type: none"> ▶ Only in the event of hazardous pumped liquid: flush and decontaminate the pump. ▶ Return the complete pump (not disassembled) to the manufacturer.

Tab. 8 Measures for return

7.3.2 Disassembly

- ✓ Pump depressurized
- ✓ Pump completely empty, flushed and decontaminated
- ✓ Electrical connections disconnected and motor secured against being switched on again
- ✓ Pump cooled down
- ✓ Pressure gage lines, pressure gage and holdings dismounted

 Progressive cavity pumps cannot be completely emptied due to their design. A residual amount of liquid remains in the pump.

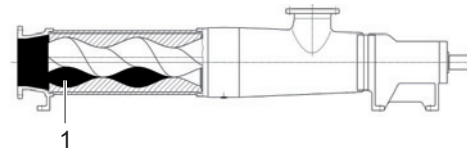



Fig. 14 Residual liquid in the pump

- ▶ Observe the following during removal:
 - Collect residual liquid (1) with a collecting container. Depending on the series, ensure the specific amount of residual liquid (→ 9.2.8 Total volume and residual liquid quantity, Page 33).
 - Mark the precise orientation and position of all components before dismounting them.
 - Dismount components concentrically without canting.
 - Dismount the pump (→ sectional drawing).

7.4 Installing

 Reinstall the components concentrically, without canting, in accordance with the marks applied.

WARNING

Risk of injury due to heavy components!

- ▶ Pay attention to the component weight. Lift and transport heavy components using suitable lifting gear.
- ▶ Set down components safely and secure them against overturning or rolling away.

WARNING

Risk of injury during assembly!

- ▶ Install spring-loaded components carefully (e.g. mechanical seal, tensioned bearing, valves etc.), as components can be ejected by the spring tension.
- ▶ Observe the manufacturer's specifications (e.g. for the motor, the mechanical seal, the gear box etc.).


NOTE

Material damage due to unsuitable components!

- ▶ Always replace lost or damaged screws with screws of the same strength. (→ 9.2.5 Tightening torques, Page 31).
- ▶ Only replace seals with seals of the same material.

1. Observe the following during installation:
 - Replace worn parts with genuine spare parts.
 - Replace seals, inserting them in such a way that they are unable to rotate.
 - Adhere to the prescribed tightening torques (→ 9.2.5 Tightening torques, Page 31).
2. Clean all parts. Do not remove any markings that may have been attached.
3. Install the pump (→ sectional drawing).
4. Installing the pump in the system (→ 5 Setup and connection, Page 14).

7.5 Ordering spare parts

 For trouble-free replacement in the event of faults, we recommend keeping entire insert units or spare pumps available on site.

The application guidelines described in DIN 24296 recommend provisions for two years of continuous use

- ▶ Have the following information ready to hand when ordering spare parts (→ nameplate):
 - Pump equipment number
 - Pump type
 - Year of manufacture
 - Part number
 - Designation
 - Quantity

8 Troubleshooting

8.1 Pump malfunctions

If malfunctions occur which are not specified in the following table or cannot be traced back to the specified causes, please consult the manufacturer.

Possible malfunctions are identified by a number in the following table. This number identifies the respective cause and remedy in the troubleshooting list.

Malfunction	Number
Pump not pumping	1
Pumping rate insufficient	2
Pumping rate irregular or too high	3
No pump suction	4
Pump running roughly	5
Pump jammed	6
Pump leaking	7
Power consumption of the motor too high/motor gets warm	8
Stator wears out prematurely	9

Tab. 9 Malfunction/number assignment

Malfunction number										Cause	Remedy
1	2	3	4	5	6	7	8	9			
X	-	-	-	-	-	-	-	-	-	Transport screw plugs still in place	<ul style="list-style-type: none"> ▶ Remove the transport and sealing cover. ▶ Dismount the pump and inspect it for dry-running damage.
X	-	-	-	-	-	-	-	-	-	Supply/suction pipe closed by fitting	<ul style="list-style-type: none"> ▶ Open the fitting.
X	-	-	-	X	-	-	-	-	-	Supply/suction pipe not bled properly or not filled up completely	<ul style="list-style-type: none"> ▶ Fill up the pump and/or piping completely and bleed them.
X	-	-	-	X	-	-	-	-	-	Formation of air pockets in the supply or suction pipe	<ul style="list-style-type: none"> ▶ Install the fitting for bleeding. ▶ Correct the piping layout.
X	-	-	-	X	-	-	-	-	-	Pressure line blocked	<ul style="list-style-type: none"> ▶ Clean the pressure line.
X	-	-	X	X	-	-	-	-	-	Pump running in the wrong sense of rotation	<ul style="list-style-type: none"> ▶ Swap any two phases on the motor (→ 6.1.5 Checking the sense of rotation, Page 19).
X	-	-	X	-	X	-	-	-	-	Pump very dirty	<ul style="list-style-type: none"> ▶ Dismount and clean the pump.
X	X	-	X	X	-	-	-	-	-	Supply/suction pipe, pump or suction strainer blocked or encrusted	<ul style="list-style-type: none"> ▶ Clean the supply/suction pipe, pump or suction strainer. ▶ Clean the suction strainer.
X	X	-	X	X	-	-	-	-	-	Air is sucked in	<ul style="list-style-type: none"> ▶ Seal the source of malfunction.
X	X	-	X	X	-	-	-	-	-	Excessive amount of gas: pump is cavitating	<ul style="list-style-type: none"> ▶ Check the cable gland. ▶ Clean/enlarge the filter. ▶ Enlarge the supply/suction pipe cross-section.
X	X	-	X	-	-	X	-	-	-	Shaft seal leaky	<ul style="list-style-type: none"> ▶ Replace the shaft seal.

Malfunction number									Cause	Remedy
1	2	3	4	5	6	7	8	9		
X	X	-	-	X	-	-	X	-	Solids content too large, grain size too large	<ul style="list-style-type: none"> ▶ Reduce speed. ▶ Install strainer with the permitted mesh size in the suction pipe.
X	X	-	-	-	-	X	-	X	Solids sediment in the liquid during a long standstill	<ul style="list-style-type: none"> ▶ Flush the pump. ▶ Dismantle and clean the pump.
X	X	-	-	X	X	-	X	-	Pumped liquid temperature too high Stator expansion too large, stator burned or swollen	<ul style="list-style-type: none"> ▶ Check the temperature of the liquid and adjust it if necessary. ▶ Allow the pump to cool down and check that rotor can move freely. If necessary, remove pump and replace the stator.
X	X	-	X	-	-	X	X	-	Foreign particles in the pump	<ul style="list-style-type: none"> ▶ Check pump for foreign particles. If necessary, disassemble the pump and remove foreign particles.
X	-	-	-	-	-	-	X	-	Adhesion between the rotor and stator	<ul style="list-style-type: none"> ▶ Turn the pump by hand, use aids if necessary.
-	X	X	X	X	-	-	-	-	Suction pipe and shaft seal leaky	<ul style="list-style-type: none"> ▶ Check suction pipe and shaft seal for leaks.
-	X	-	X	-	-	-	-	-	Motor speed too low	<ul style="list-style-type: none"> ▶ Compare the required motor speed with the specifications on the pump nameplate. Replace the motor if necessary. ▶ Increase the motor speed if speed control is available.
-	X	-	X	-	-	-	-	-	Supply/suction pipe not fully opened	<ul style="list-style-type: none"> ▶ Open the fitting.
-	X	-	X	-	-	-	-	-	Low speed for liquids with low viscosity and high suction volume	<ul style="list-style-type: none"> ▶ Increase speed.
-	X	-	X	-	X	-	-	X	No liquid in the feed/suction pipe	<ul style="list-style-type: none"> ▶ Ensure inflow of pumped liquid.
-	X	X	X	-	-	-	-	-	Pumped liquid viscosity too high	<ul style="list-style-type: none"> ▶ Check the viscosity of the pumped liquid.
-	X	-	X	X	-	-	-	-	Supply/suction pipe cross-section too narrow	<ul style="list-style-type: none"> ▶ Enlarge the supply/suction pipe cross-section. ▶ Remove any encrustations from the suction pipe. ▶ Open the fitting completely.
-	X	-	X	X	-	-	-	-	Suction head excessive: $NPSH_{pump}$ larger than $NPSH_{system}$	<ul style="list-style-type: none"> ▶ Increase the suction pressure. ▶ Consult the manufacturer.
-	X	-	X	X	-	-	-	-	Pumped liquid temperature too high: pump is cavitating	<ul style="list-style-type: none"> ▶ Increase the pump inlet pressure. ▶ Lower the temperature. ▶ Consult the manufacturer.
-	X	-	X	X	-	-	-	-	Hydraulic parts of the pump dirty, clotted or encrusted	<ul style="list-style-type: none"> ▶ Dismount the pump. ▶ Clean the parts.
-	X	-	X	-	-	-	X	-	Viscosity or specific gravity of the pumped liquid outside the range specified for the pump	<ul style="list-style-type: none"> ▶ Consult the manufacturer.
-	X	-	X	-	X	-	-	X	Suction pipe completely or partially blocked.	<ul style="list-style-type: none"> ▶ Clean suction pipe and any strainers and filters.
-	-	-	-	X	-	-	-	-	Pressure-side fitting not opened wide enough	<ul style="list-style-type: none"> ▶ Open the pressure-side fitting.

Malfunction number									Cause	Remedy
1	2	3	4	5	6	7	8	9		
-	X	-	X	X	X	-	-		Pump parts worn	▶ Replace the worn pump parts.
-	-	X	-	X	-	-	X		Motor speed too high	▶ Compare the required motor speed with the specifications on the pump nameplate. Replace the motor if necessary. ▶ Reduce the motor speed if speed control is available.
-	-	-	X	X	-	-	-	-	Speed too high with viscous liquid: pump is cavitating	▶ Reduce the motor speed if speed control is available.
-	-	-	-	-	X	-	X		Defective antifriction bearing in motor	▶ Replace the antifriction bearing.
-	-	-	-	-	-	X	-		Tie bolts not tightened properly	▶ Tighten the tie bolts.
-	-	-	-	-	-	X	-		Mechanical seal worn	▶ Replace the mechanical seal.
-	-	-	-	-	-	X	-		Housing seal defective	▶ Replace the housing seal.
-	-	-	-	X	X	X	X		Pump distorted	▶ Check the pipe connections and pump attachment.
-	X	-	X	X	-	-	X		Motor running on 2 phases	▶ Check the fuse and replace it if necessary. ▶ Check the cable connections and insulation.

Tab. 10 Pump troubleshooting list

9 Appendix

9.1 Sectional drawings

9.1.1 Part numbers and designations

The marked parts are available as **arepair set** from the manufacturer::

- **R**= large repair set
- **r**= small repair set

Part no.	Designation	Repair set	Quantity
001	Snap ring ^{4) 5)}		4
002	Wheel ^{4) 5)}		2
003	Hexagon nut ⁵⁾		4
004	Hexagon head bolt ⁵⁾		4
005	Washer ⁵⁾		8
006	Drive		1
007	Chassis ^{4) 5)}		1
008	Dry-running protection		1
008	Tilting base ^{4) 5)}		1
123	Clamping set		1
125	Stub shaft	R	1
214	Mechanical seal housing		1
219	Mechanical seal	R	1
301	Joint pin	R, r	2
302	Joint bush ¹⁾	R, r	2
303	Bush for joint pin	R, r	4
304	Joint sleeve	R, r	2
305	Joint oil ³⁾	R, r	
306	Joint clamp	R, r	4
307	Universal joint shaft	R, r	1
308	Joint sleeve	R, r	2
401	Rotor	R, r	1
402	Stator	R, r	1
501	Gasket for suction casing	R	1
502	Screw plug		1
503	Seal ring		1
504	Discharge casing		1
504	Seal ring ²⁾		1
505	Suction casing		1
505	Seal ring ²⁾		1

Part no.	Designation	Repair set	Quantity
601	Nameplate		1
602	Round head grooved pin		2
603	„Commissioning“ information plate		1
609	Hexagon nut		8
610	Washer		8
611	Clamp bolt		4
612	Support ²⁾		1
612	Handle ^{4) 5)}		1
627	Risk of injury information plate		1

Tab. 11 Designation of components according to part numbers

- 1) Omitted for AEB2N 3, AEB2N 6, AEB2N 12, AEB.E 25, AEB.E 50; AEB 1F103
- 2) Omitted for DN 90 mash thread connection and VE design
- 3) See chap. entitled Lubricant
- 4) Omitted for SE design
- 5) Omitted for VE design

Additional information in sectional drawings

Additional information is marked in the sectional drawings, for example regarding versions or sizes:

Labels	Explanation
B	Part secured with a punch
F	Thrust bearing for specified sizes
H	Version with winding protection on universal joint shaft
R	Stator with uniform elastomer wall thickness

Tab. 12 Additional information in sectional drawings

9.1.2 Sectional drawings

Pumps/pump units

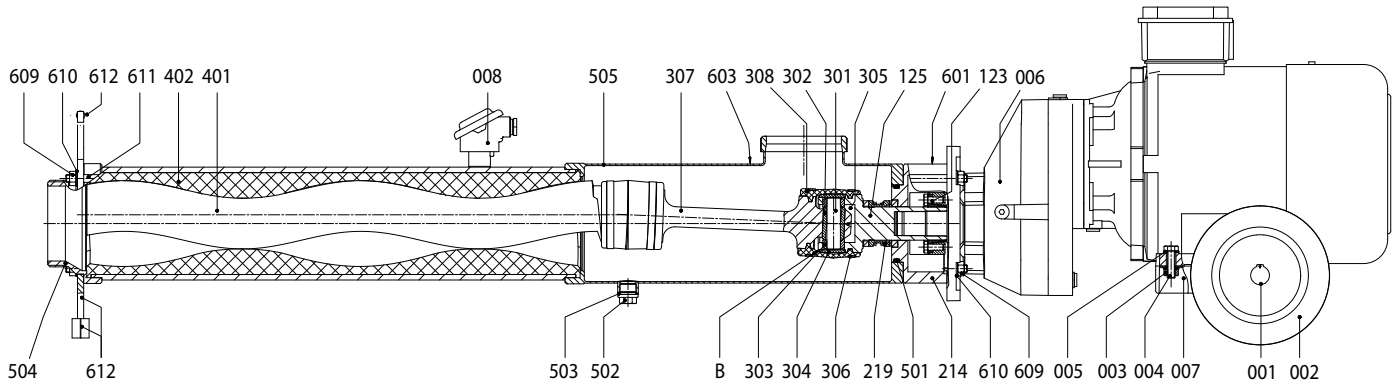


Fig. 15 AEB, ME design

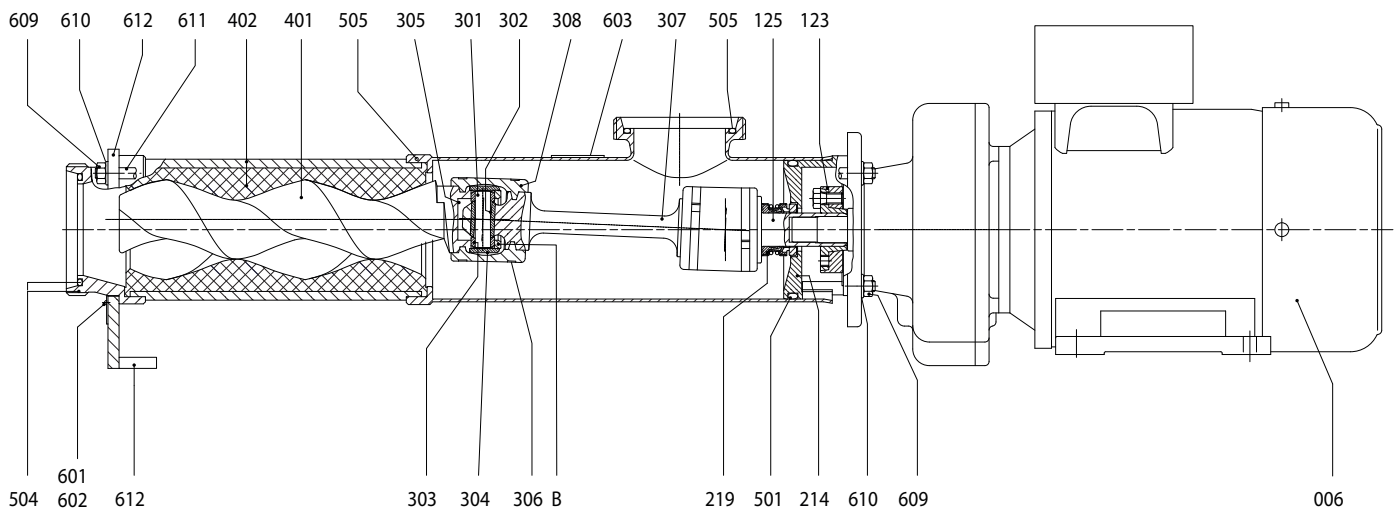


Fig. 16 AEB, SE design, with base plate

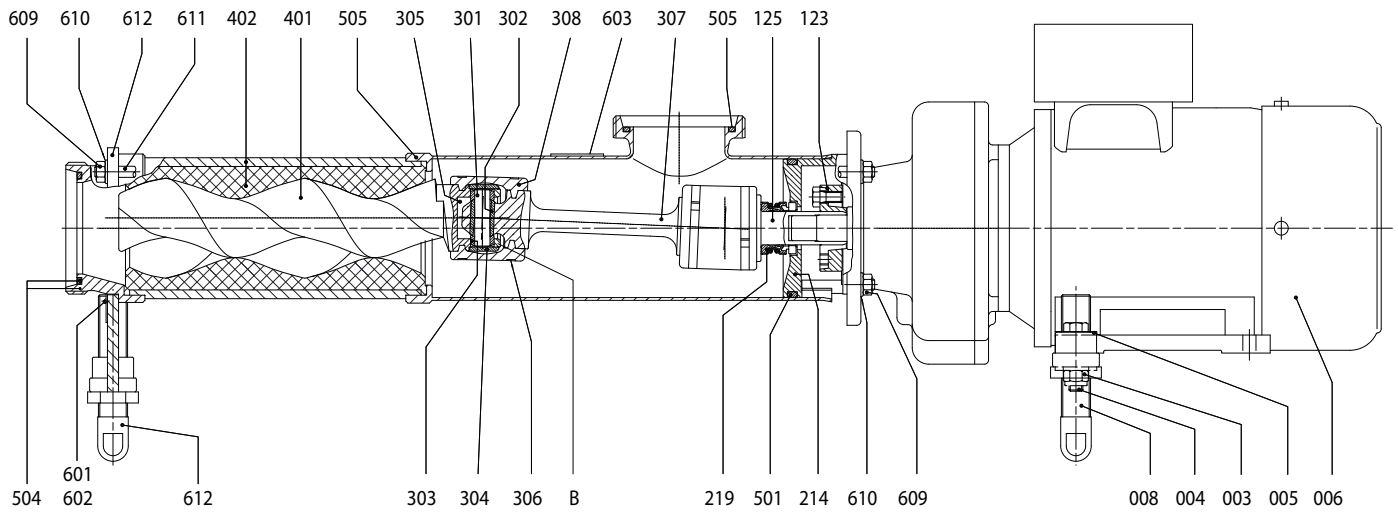


Fig. 17 AEB, SE design, with tilting base

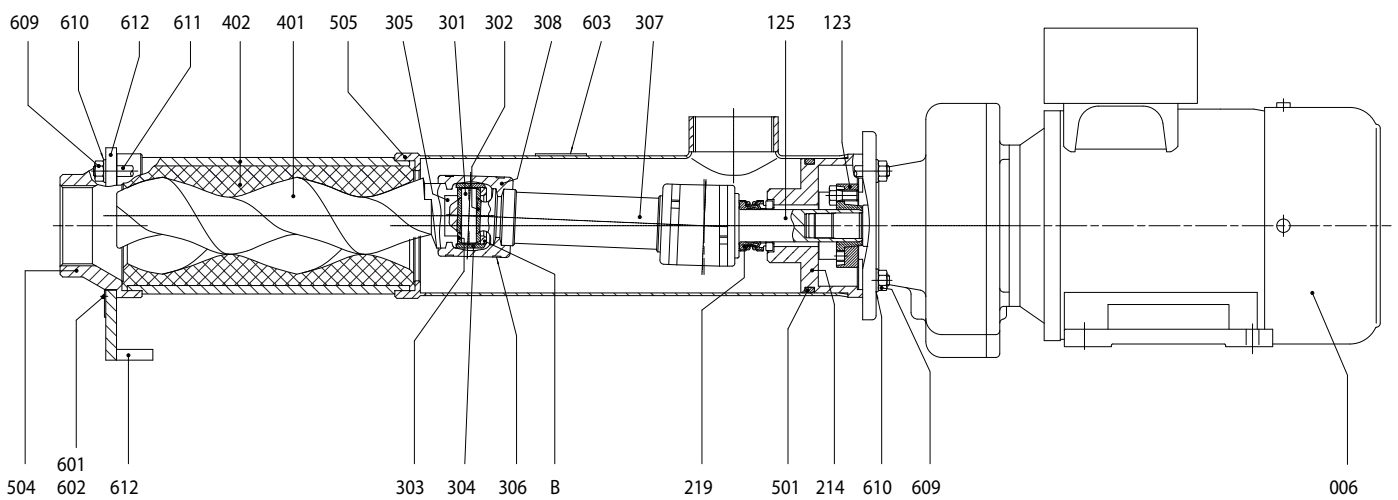


Fig. 18 AEB, VE design

Stator versions

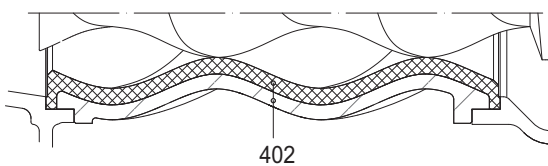



Fig. 19 Stator versions

9.2 Technical specifications

9.2.1 Ambient conditions

 Operation under any other ambient conditions should be agreed with the manufacturer.

Temperature [°C]	Relative humidity [%]		Setup height above sea level [m]
	Long-term	Short-term	
-20 to +40	≤ 85	≤ 100	≤ 1000

Tab. 13 Ambient conditions

9.2.2 Preservatives

Use Valvoline preservatives or similar (recommended), depending on pump area

- Inside: Tectyl 502-C-EH
- Outside: Tectyl 846-K-19

Type of storage	Storage duration [months]	Renew preservation [months]	
		Interior	Exterior
Closed, dry, dust-free room	6–12	–	–
	>12	24	36
In open air, central European climate	6–12	3	–
	>12	3	12
Outdoors, tropical climate, aggressive industrial atmosphere or close to sea	6–12	3	–
	>12	3	12

Tab. 14 Type, duration and deadlines for preservation when storing the pump

9.2.3 Cleaning agents

Application area	Storage duration [months]
Foodstuffs and drinking water sector	For example, spirit, strong alkaline soapy solution, steam jet (for single parts only)
Miscellaneous	Benzine, wax solvents, diesel, paraffin, alkaline cleaners

Tab. 15 Cleaning agents

9.2.4 Lubricants

Lubrication point	Lubricants
Joints of the universal joint shaft	<ul style="list-style-type: none"> • ALLWEILER special joint oil type B • ALLWEILER special joint oil type BL for food
Spur gears	Industrial gear oil CLP 220 according to DIN 51517, Part 3

Tab. 16 Lubricants

9.2.5 Tightening torques

Thread size	Tightening torque ¹⁾ [Nm] for strength class			
	4.6	5.6	8.8	A4-70
M6	3.5	4.6	6.5	7.7
M8	8.4	11	27.3	18.8
M10	17	22	54	37.3
M12	29	39	93	64.5
M16	71	95	230	159

Tab. 17 Tightening torques for screws

1) Applies to standard threads, coefficient of friction $\mu_{\text{total}} = 0.14$

9.2.6 Sound pressure level

Measuring conditions:

- Distance to the pump: 1 m
- Operation: cavitation-free
- Motor: IEC standard motor
- Tolerance ± 3 dB

If the values for speed and/or differential pressure mentioned in the tables below are undershot, the sound pressure and sound power level decrease.

1-stage pumps

Size	Motor speed [rpm]	Differential pressure Δp [bar]	Sound pressure level L_p (A) [dB(A)]
25	850	6	< 70
50	800	6	
100	700	6	
100 G ¹⁾	700	10	74.3
103	660	6	< 70
200	600	6	
200 G ¹⁾	600	10	72.3
203	530	6	< 70
380	500	6	
380 G ¹⁾	500	10	76.0
403	420	6	71.4
550	500	6	73.8
553	500	6	73.8
703	350	6	73.7

Tab. 18 Sound pressure level for 1-stage pumps

1) Stator with uniform elastomer wall thickness

2-stage pumps

Size	Motor speed [rpm]	Differential pressure Δp [bar]	Sound pressure level L_p (A) [dB(A)]
3	1000	12	< 70
6	1000	12	
12	900	12	
25	850	10	
50	800	10	
100	700	10	
200	600	10	71.8
380	500	10	76.9

Tab. 19 Sound pressure level for 2-stage pumps

1) Stator with uniform elastomer wall thickness

9.2.7 Technical data for specific pump groups

Below pumps are classified in **Pump groups** based on **Series** and **size**. Specific technical data for the packing gland, lubrication quantities and volumetric flow rates apply to each pump group.

Series	Size				
		103	203	403	553 703
AEB-F	–	103	203	403	553 703
AEB-E	25	50	100	200	380 550
AEB-N	3 6 12	–	–	–	–
Pump group	1	2	3	4	5

Tab. 20 Pump groups

Lubricant quantities

Parameter	Values by pump group				
	1	2	3	4	5
Oil per joint [cm ³]	4	10	18	37	52

Tab. 21 Lubrication quantities by pump group

9.2.8 Total volume and residual liquid quantity

AEB1F

Parameter	Values by size [l]				
	103	203	403	553	703
Total volume	1.30	2.25	4.12	6.95	7.41
Residual liquid quantity	0.35	0.65	1.18	1.68	2.02

Tab. 22 Total volume and residual liquid quantity AEB1F

AEB1E

Parameter	Values by size [l]				
	50	100	200	380	550
Total volume	1.19	2.06	3.62	6.49	6.95
Residual liquid quantity	0.25	0.46	0.81	1.33	1.68

Tab. 23 Total volume and residual liquid quantity AEB1E

AEB2E

Parameter	Values by size [l]			
	50	100	200	380
Total volume	1.31	2.31	4.12	7.39
Residual liquid quantity	0.37	0.71	1.31	2.23

Tab. 24 Total volume and residual liquid quantity AEB2E

AEB2N

Parameter	Values by size [l]		
	3	6	12
Total volume	0.7	0.7	0.7
Residual liquid quantity	0.10	0.10	0.10

Tab. 25 Total volume and residual liquid quantity AEB2N

9.3 Declaration of harmlessness

This declaration of harmlessness of the operator is used to ensure work safety and the protection of our employees, the transport company and the environment from harmful effects when handling dangerous materials as well as to protect you from claims for compensation.

Every commercial company is obligated to comply with the legal regulations on work safety, set forth for example in Germany in the Workplace Ordinance (ArbStättV), the Accident Prevention Regulations (UVV), the Hazardous Substances Ordinance (GefStoffV) and the applicable environmental regulations.

When returning pumps and their accessories, please send them back to us in a properly cleaned condition (safe and harmless for health and environment) and confirm the safety and harmlessness of the medium used.

If used with toxic, microbiological, explosive, radioactive or other hazardous substances, the safety data sheet must be provided to us and enclosed to the shipment.

Failure to follow the above instructions will lead to the implementation of measures that ensure the safe handling of the pump or the device, at your cost. We reserve the right to reject contaminated pumps and accessories and to return them for cleaning at your cost!

This declaration of harmlessness must be attached clearly visible outside of the packaging of the return shipment, and if possible sent in advance by e-mail including the safety data sheet, if applicable, to: service-emea-gr@circor.com. Please understand that return shipments without a declaration of harmlessness cannot be processed until such declaration is received.

Please copy this document and send it together with the pump. www.allweiler.de/en/sales-service/downloads



Pump type _____

Serial number: _____

Was the pump operated with hazardous substances or other media that are hazardous to health or the environment?

- No
 Yes

Medium used:

UN / CAS number (see safety data sheet):

The pump has been thoroughly drained and cleaned outside and inside prior to dispatch or provision.

Special safety precautions are not necessary.

Special safety precautions regarding residual liquid, rinsing media, personal protective equipment and disposal are necessary (safety data sheets are required and must be sent in advance/enclosed).

Aside from the medium specified, are there any other safety aspects that need to be observed (for example, the cleaning medium used)?
If yes, which:

Up-to-date safety data sheet enclosed.

We do not accept return shipment of pumps or parts thereof that have been exposed to radioactive or microbiological contamination and that were not properly decontaminated.

Contact: _____

Tel. / fax / e-mail: _____

Legally binding declaration:

We hereby certify that we have completed this declaration fully and truthfully to the best of our knowledge. The dispatch is performed in compliance with all legal requirements that apply to the packaging, shipping, and labeling of hazardous substances. The sender is liable for all damages caused by unmarked decontaminations of the returned object.

Place, date

Signature

Stamp

Tab. 26 Declaration of harmlessness

